

REMARKS

Claims 1 through 52 are pending in the subject application. Claims 13-35 have been withdrawn from prosecution. Claims 1, 3, 4, 6, and 9-11 stand rejected under 35 USC 102(b). Claims 1-4, 6-8, 10, and 11 have been rejected under 35 USC 102(e). Claims 5 and 12 stand rejected under 35 U.S.C. 103(a). Claims 1, 2, 10, and 11 have been amended. Claims 36-52 have been newly added.

The Applicants appreciate the Examiner's thorough examination of the subject application. However, the Applicants respectfully request reconsideration of the subject application based on the above amendments and the following remarks.

35 U.S.C. § 102(b) REJECTIONS

The Examiner has again rejected claims 1, 3, 4, 6, and 9-11 under 35 USC § 102(a) as being anticipated by Japanese Laid-Open Published Patent Application Number 06-005577 (the "Japan Reference"). The Applicants respectfully traverse these rejections based on the above amendments and the following remarks.

The invention as claimed provides a cleaning apparatus that places an object to be cleaned between a scrubbing means and an ultrasonic wave projection means so that the scrubbing means cleans the upper surface of a substrate 10 using a brush roller 1 and, simultaneously, the ultrasonic wave projection means applies ultrasonic waves to the lower surface of the substrate 10 to clean both the lower and upper surfaces by ultrasonic vibrations. Specifically,

[t]he ultrasonic nozzle 2 is arranged so as to spray the aqueous cleaning agent 12 from its leading end against the center of the roll brush 1 (upwards in the vertical line). The ultrasonic nozzle 2 stores therein an ultrasonic vibrator 2a for applying ultrasonic

wave onto the center of the roll brush 1 (upwards along the vertical line).

Therefore, in the state where the substrate 10 is set in the cleaning apparatus, the ultrasonic nozzle 2 blows the aqueous cleaning agent against the lower surface (back surface) of the substrate 10, and in the meantime applies ultrasonic vibrations to the aqueous cleaning agent 12. In this way, by applying the ultrasonic wave to the lower surface of the substrate 10 to be propagated to the upper surface, not only the lower surface but also the upper surface of the substrate 10 can be ultrasonically cleaned.

Specification, page 20, lines 9-25 (Emphasis added).

Moreover, although, the ultrasonic nozzle 2 and brush 1 are disposed on opposing sides of the substrate 10, the ultrasonic waves propagate from the point of application on the lower surface of the substrate 10 to the upper surface of the substrate 10 so that both surfaces are ultrasonically cleaned. See, e.g., Specification, page 25 lines 1-10.

The Japan reference discloses a substrate washing apparatus having an overflow tank 8 in which substrate 12 are totally immersed in a cleaning fluid and subject to a rotary brush 5 on a top side only and to ultrasonic washing from an oscillator 7 on the back or bottom side only. See, e.g., Translation of paragraphs 0019 and 0020. The shortcomings of the Japan reference are discussed in the Field of the Invention section of the present application. For example, the immersion (cleaning) fluid itself is contaminated and re-deposition of dust particles onto the surface of the substrate is possible. See, e.g., page 12, line 4 to page 14, line 8.

The present invention does not totally immerse or submerge the substrate in a cleaning solution as taught by the Japan reference. Therefore, the present invention does not suffer from the same shortcomings listed above. Accordingly, the Applicants respectfully assert that, the Japan reference does not anticipate the present invention.

Moreover, the Japan reference does not teach, mention or suggest providing an ultrasonic wave to the back side of the substrate that propagates through the substrate to clean the upper surface simultaneously.

In short, it is respectfully submitted that, claims 1, 3, 4, 6, and 9-11 are not anticipated by the Japan reference, and further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 102(b). Accordingly, the claims are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

35 U.S.C. § 102(e) REJECTIONS

The Examiner has again rejected claims 1-4, 6-8, and 10-11 under 35 USC § 102(e) as being anticipated by U.S. Patent Application Number 6,158,075 to Tanaka, et al. ("Tanaka" or the "Tanaka Reference"). The Applicants respectfully traverse these rejections based on the above amendments and the following remarks.

According to the Tanaka reference:

[t]he front face of the wafer W washed in the scrubber mechanism 23 is further washed by the megasonic nozzle 26 with a washing liquid excited by an ultrasonic wave. The megasonic nozzle 26, which is substantially equal in construction to the scrubber mechanism 23, comprises an arm 44 and a nozzle body 45 mounted to a tip of the arm 44. A washing liquid supply line, which is connected at one end to the nozzle body 45, is connected at the other end to an oscillator (not shown) such that a washing liquid excited by an ultrasonic wave having a predetermined number of vibration is supplied to the nozzle body 45.

Tanaka, col. 8, lines 3-13.

Although, as shown in FIG. 6, the megasonic nozzle 26 and the brushing section 29 are disposed opposite of each other, the components are not in registration with opposing sides of the object to be cleaned. Indeed, the object to be cleaned is not disposed between the brushing section and the megasonic nozzle. The nozzle 26 and brushing section 29 are both in registration with the upper surface of the object to be cleaned albeit at opposing sides of the same (upper) surface.

According to the invention as claimed, an object to be cleaned is placed between a scrubbing means and an ultrasonic wave projection means so that the scrubbing means cleans the upper surface of a substrate 10 using a brush roller 1 and, simultaneously, the ultrasonic wave projection means applies ultrasonic waves to the lower surface of the substrate 10 to clean both the lower and upper surfaces by ultrasonic vibrations. This feature of the present invention is not taught, mentioned or suggested by Tanaka. Nor does Tanaka teach, mention or suggest propagating an ultrasonic wave through the substrate to clean an upper surface using a brush and ultrasonic waves simultaneously.

In short, it is respectfully submitted that, claims 1-4, 6-8, and 10-11 are not anticipated by the Tanaka reference, and further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 102(e). Accordingly, the claims are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

35 U.S.C. § 103(a) REJECTIONS

The Examiner has again rejected claims 5 and 12 under 35 USC 103(a) as being unpatentable over the Japan reference. The Applicants respectfully traverse these rejections for the same reasons provided above, in that, the Japan reference does not

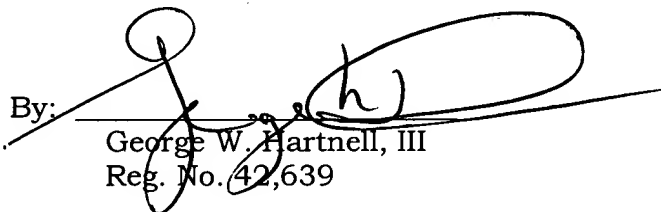
teach, mention or suggest simultaneously scrubbing and ultrasonically washing the same side of a substrate with a brush means and an ultrasonic wave projection means that are in registration with opposing sides of the object to be cleaned. Moreover, the Japan reference teaches cleaning the substrate by total immersion in a cleaning fluid, which teaches away from the invention as claimed.

Therefore, it is respectfully submitted that, claims 5 and 12 are not made obvious any of the Japan reference, and further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 103(a). Accordingly, claims 5 and 12 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

The Applicants believe that no additional fee is required for consideration of the within Response. However, if for any reason the fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

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